

# Final Evaluation Findings

## Delaware Coastal Management Program

October 2011 to May 2019

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## Summary of Findings

The Coastal Zone Management Act requires the National Oceanic and Atmospheric Administration (NOAA) to conduct periodic evaluations of the performance of states and territories with federally approved coastal management programs. This evaluation examined the operation and management of the Delaware Coastal Management Program administered by the Delaware Department of Natural Resources and Environmental Control, the designated lead agency, for the period from October 2011 to May 2019. The evaluation focused on three target areas: coastal resilience, science to management, and program administration.

The findings in this evaluation document will be considered by NOAA in making future financial award decisions concerning the Delaware Coastal Management Program. The evaluation came to these conclusions:

### *Findings for Administration*

**Accomplishment:** The Delaware Coastal Management Program reinvigorated and made significant improvements to its federal consistency program, including developing processes to ensure that knowledge could be transferred between staff members. For example, the coastal program implemented an electronic submission process for submittals and worked with the Department of Natural Resources and Environmental Control and state and federal agencies to educate staff and improve federal consistency processes.

**Recommendation:** The NOAA Office for Coastal Management encourages the Delaware Coastal Management Program to continue to strengthen its implementation of federal consistency through (a) setting and implementing a regular schedule for program change updates, (b) completing a list of federal activities subject to review, (c) developing a list of de minimis activities, and (d) developing a new federal consistency database that incorporates efforts to streamline the review process and allows for more effective work processes across state agencies.

### *Findings for Science to Management*

**Accomplishment:** The Delaware Coastal Management Program, in close partnership with the Delaware National Estuarine Research Reserve, is a leader in identifying emerging issues and developing innovative ways to connect partners, researchers, and stakeholders to support applied research that results in science-based management solutions.

### **Recommendation**

The NOAA Office for Coastal Management encourages the Delaware Coastal Management Program to continue to support applied science to identify innovative solutions to emerging issues and guide development of new and revised regulations, including using research results to guide development of regulations that include sea level rise considerations.

### ***Findings for Coastal Resilience***

**Accomplishment:** The Delaware Coastal Management Program has continued to build on the early groundwork laid to increase the state’s coastal resilience. The coastal program

- brought together state agencies and other partners to collaborate through the Resilient and Sustainable Communities League;
- provided educational and outreach opportunities to build capacity throughout the state;
- supported research and the development of tools to inform decision-making; and
- provided technical and financial support to local communities to support efforts to build resilience.

**Recommendation:** The NOAA Office for Coastal Management encourages the Delaware Coastal Management Program to build on its success in increasing the state’s coastal resilience by exploring opportunities and innovative means to increase staff capacity to provide technical assistance and support local governments and other stakeholder efforts.

This evaluation concludes that the Delaware Coastal Management Program is successfully implementing and enforcing its federally approved coastal management program, adhering to the terms of the federal financial assistance awards, and addressing coastal management needs identified in section 303(2)(A) through (K) of the Coastal Zone Management Act

## Program Review Procedures

The National Oceanic and Atmospheric Administration (NOAA) evaluated the Delaware Coastal Management Program in fiscal year 2019. The evaluation team consisted of Carrie Hall, evaluation team lead; John Kuriawa, site liaison; Darlene Finch, lead, Mid-Atlantic region; and Scudder Mackey, chief, Ohio Office of Coastal Management. The support of Delaware Coastal Management Program staff members was crucial in conducting the evaluation, and this support is most gratefully acknowledged.

NOAA sent a notification of the scheduled evaluation to the secretary of the Delaware Department of Natural Resources and Environmental Control, published a notice of “Intent to Evaluate” in the *Federal Register* on May 3, 2019, and notified members of Delaware’s congressional delegation. The coastal management program posted a notice of the public meeting and opportunity to comment in the *Delaware State News* and *The News Journal* on March 31, 2019.

The evaluation process included a review of relevant documents and a survey of stakeholders, which helped identify three target areas for the evaluation: coastal resilience, science to management, and program administration. A site visit was conducted and the evaluation team held meetings with staff members and group discussions with stakeholders and program staff members about the target areas. In addition, a public meeting was held on Monday, May 20, at 5:30 p.m. in the Street Commons Training Room, 100 W. Water Street, Suite 6A, Dover, Delaware, to provide an opportunity for members of the public to express their opinions about the implementation of the program. Stakeholders and members of the public were also given the opportunity to provide written comments. No written comments were received. NOAA then developed draft evaluation findings, which were provided to the Delaware Department of Natural Resources and Environmental Control for review, and the department’s comments were considered in drafting the final evaluation findings.

Final evaluation findings for all coastal management programs highlight the program’s accomplishments in the target areas and include recommendations, which are of two types.

**Necessary Actions** address programmatic requirements of the Coastal Zone Management Act or its implementing regulations at 15 C.F.R. Part 923 and of the state coastal management program approved by NOAA, and the terms of any grant or cooperative agreement funded under the Coastal Zone Management Act. Necessary actions must be carried out by the date specified. Failure to address necessary actions may result in a future finding of non-adherence and the invoking of interim sanctions, as specified in the Coastal Zone Management Act §312(c).

**Recommendations** are actions that the office believes would improve the program but which are not mandatory. The state is expected to have considered the recommendations by the time of the next evaluation or dates specified.

## Evaluation Findings

### Program Administration

#### *Administration*

The Delaware Department of Natural Resources and Environmental Control reorganized in 2018, and the Delaware Coastal Management Program was moved from the Office of the Secretary into the new Division of Climate, Coastal, and Energy. The coastal program also saw major staffing changes including the retirement of the long-term manager and the administrator, who oversaw both the Coastal Management Program and Delaware National Estuarine Research Reserve. The program has had a high level of staff turnover over the evaluation period and loss of institutional knowledge, as staff members have left to pursue other opportunities. During most of the evaluation period, there was a state hiring freeze or other restrictions that limited the filling of vacant positions. As of November 2018, the coastal program had achieved full staffing.

The coastal program was able to expand staff capacity through hosting three coastal management fellows and student interns, successfully addressing a concern noted in the previous evaluation findings (2012) that the program would not be able to provide the necessary match for coastal fellowships. The coastal program also capitalized on its efforts to build the next generation of coastal managers and hired past interns to fill empty positions. The coastal program has also taken steps to limit future loss of institutional knowledge due to staff turnover, such as requiring desk manuals and a file log for each project that includes a correspondence log to document phone conversations and written communications. New staff members can now look back and understand the decision-making process. In addition, the program has developed a mentoring program to support new employees and has developed a list of trainings. The office encourages the coastal program to have new employees complete the online NOAA Coastal Zone Management Act 101 training and other relevant Digital Coast trainings.

The new program administrator has reorganized the Delaware National Estuarine Research Reserve and Coastal Management Program into three main groups: 1) Applied Sciences, 2) Outreach and Delaware National Estuarine Research Reserve Operations, and 3) Policy, Special Projects, and Coastal Program Operations. Since the evaluation, additional changes have occurred, including incorporating the Coastal Zone Act Program into the Coastal Programs Section within the Division of Climate, Coastal, and Energy. The Coastal Management Program and National Estuarine Research Reserve work closely together, particularly on federal consistency, science, and training. The federal coastal zone award supports half of the applied sciences group and is used to jointly fund several positions with the research reserve, including the research coordinator, who serves as the senior scientist for the coastal program; the stewardship coordinator, who is responsible for federal consistency reviews concerning critical land and habitat impacts; and the coastal training program coordinator, who supports coastal

program outreach and community interactions. The reserve also conducts research and investigates priority coastal management concerns, and these efforts are supported financially by the coastal program.

The coastal program has played a key role in initiating work on critical emerging issues, such as climate change and marine debris, and is providing seed funding to spark science, research, and monitoring to address these issues. The coastal program has excelled at supporting communities through technical and financial assistance, helping communities develop and implement policies and tools that address emerging issues. The coastal program's convening of state agencies and key partners through the Resilient and Sustainable Communities League has maximized the state's resources to better prepare the state for coastal hazards and climate change.

### ***Federal Consistency***

In 2018, the coastal program hired a new federal consistency coordinator who has streamlined and improved implementation of federal consistency. The federal consistency coordinator has gathered and documented historical precedents regarding Delaware federal consistency procedures and issues to better preserve long-term knowledge. The coastal program developed and implemented a system for electronic submission of information.

Federal consistency staff have worked to strengthen partnerships with federal and state agencies and held many presentations and meetings to increase understanding of Delaware's federal consistency process. Due to high staff turnover within the state, many of those working on federal consistency are new to their positions. To help address training needs for state staff, the coastal program held a federal consistency retreat in 2018 to assess the strengths and weaknesses of the program, learn from networked partners, and discuss standard operating procedures. As a result of these coordination efforts, the coastal program instituted a plan of communication for receiving comments from the state's networked partners. This coordination has increased the comments received from networked partners and has strengthened the ability of the coastal program to respond to issues raised in federal consistency reviews. The coastal program has also improved its ability to communicate deadlines to ensure comments are received in a timely manner. Site visits in coordination with other permitting agencies have been encouraged and have resulted in a better understanding of the permit process for projects and their possible effects on coastal uses and resources.

The coastal program is pursuing opportunities to strengthen its implementation of federal consistency. The Delaware federal consistency coordinator took the lead in convening other Mid-Atlantic state federal consistency coordinators to build relationships and share approaches and lessons learned. Coastal program staff have been working with the Army Corps of Engineers to improve coordination. Staff are also working with federal agencies to further refine the state's federal activities list and develop a list of de minimis activities that would not be subject to further federal consistency review. The coastal program also has the opportunity to develop a schedule to submit program updates to NOAA for incorporation into the federally approved program every two or three years.

The coastal program is challenged with updating its federal consistency database as the contractor who built the system is no longer an authorized state vendor. The department is updating its information technology infrastructure. Implementation of federal consistency is a core part of the approved coastal program, and the department and coastal program should work to ensure that a new federal consistency database is developed that meets the needs of the coastal program and facilitates more effective work processes.

### ***Regional Partnerships***

The Delaware Coastal Management Program has contributed to regional coastal management efforts through both the Mid-Atlantic Regional Council on the Ocean (MARCO) and the Mid-Atlantic Regional Planning Body. The coastal program participated in the development of the Mid-Atlantic Regional Ocean Action Plan. The program also led the Regional Ocean Assessment workgroup that developed a comprehensive report summarizing the best available information on the ocean ecosystem and ocean uses from New York to Virginia. The report provided the basis for the development of the Mid-Atlantic Regional Ocean Action Plan, which was approved in 2016 and rescinded in 2018. With the elimination of regional planning bodies (federally led), the coastal program has continued to participate in a variety of key workgroups and regional initiatives that continue to be led by MARCO and to engage in the new regional intergovernmental ocean entity, Mid-Atlantic Committee on the Ocean. The coastal program participates in multiple MARCO workgroups, including marine debris, ocean indicators, ocean data mapping, non-consumptive recreational uses, and maritime commerce and navigation safety. In 2016, the coastal program authored a report on the assessment of marine debris in the Mid-Atlantic. The coastal program's senior scientist has served as the co-lead for the Mid-Atlantic Coastal Acidification Network, led by MARCO, and the Mid-Atlantic Regional Association Coastal Ocean Observing System, helping to lead the region's science and efforts to raise awareness of ecological impacts of ocean acidification.

### ***Coastal Policy***

The State of Delaware passed the Coastal Zone Act in 1971, which restricted industrial activities in the strip of lands along the eastern boundary of Delaware to those entities and sites and their specific uses existing at the time. In June 2017, the State of Delaware passed the controversial Coastal Zone Conversion Permit Act granting the 14 grandfathered sites the ability to have use conversions and tasked the department with developing regulations for the issuance of conversions permits and setting permit fees. Supporters of the Coastal Zone Conversion Permit Act see it as an opportunity to grow the state's economy and bring in new industry and an opportunity to clean up contaminated sites before reutilization. Opponents of the bill are concerned that it will result in increased air and water pollution and further increase public health risks in the surrounding communities. The department, with the coastal program providing technical assistance, undertook an extensive and inclusive process to develop regulations to support the conversion use permits. The public was involved extensively throughout the process. A Regulatory Advisory Council was established and met monthly. Members were chosen through a public nomination process and had diverse backgrounds,



experiences, and perspectives. To support the council, four workgroups were established: Environmental Impacts, Environmental Offsets, Economic Effects-Economic Impacts, and Financial Assurance. The coastal program provided funding for one of two consultant groups facilitating the regulation development process, served as coordinator for the Environmental Offsets Workgroup, and participated in the Environmental Impacts Workgroup. Since the end of the evaluation period, the regulations to approve the process were approved in September 2019, and in December 2019, the fees were established. Through this work, the coastal program demonstrated competence and leadership in policy development and effective stakeholder engagement.

### ***Findings for Administration***

**Accomplishment:** The Delaware Coastal Management Program reinvigorated and made significant improvements to its federal consistency program, including developing processes to ensure that knowledge could be transferred between staff members. For example, the coastal program implemented an electronic submission process for submittals and worked with the Delaware Department of Natural Resources and Environmental Control and other state and federal agencies to educate staff members and improve federal consistency processes.

**Recommendation:** The NOAA Office for Coastal Management encourages the Delaware Coastal Management Program to continue to strengthen its implementation of federal consistency through (a) setting and implementing a regular schedule for program change updates, (b) completing a list of federal activities subject to review, (c) developing a list of de minimis activities, and (d) developing a new federal consistency database that incorporates efforts to streamline the review process and allows for more effective work processes across state agencies.

## **Science to Management**

### ***Overview***

The coastal program is adept at identifying emerging issues and gaps in understanding and developing innovative ways to connect partners, researchers, and stakeholders to find solutions to pressing and emerging issues. For example, the program has helped to improve understanding of coastal management issues such as microplastics and derelict crab pots by bringing partners together and using the reserve to direct seed funding to other researchers. As one partner noted, they “bring new ideas and connections” to bear on emerging issues. The coastal program and reserve’s long-standing support of monitoring has positioned the state to have the data necessary to plan and construct successful restoration projects. For example, wetland monitoring before Superstorm Sandy provided critical information that was used to guide marsh and wetland restoration efforts post-storm. In 2014, the coastal program completed the Delaware River and Bay Benthic Mapping Project. The project was designed to provide a base map for bay bottom habitat and sediments that could help frame current and future research, data collection, and monitoring activities. Project results are publicly available

in a GIS database and are used to guide permitting and planning activities and associated management actions that affect the Delaware River and Bay.

### ***Coastal Habitat***

The coastal program began working with Prime Hook National Wildlife Refuge in 2010 to monitor water quality issues and loss of habitat. In the early 2010s, several storms caused minor breaches in the freshwater impoundments along the Delaware Bay, and then in 2012 Superstorm Sandy destroyed large sections of the dunes, essentially converting the impoundments into a tidal bay. The coastal program and research reserve's monitoring network and knowledge of local hydrology helped to inform the project design and monitoring.

The Prime Hook National Wildlife Refuge marsh restoration project was one of the largest ever done in the eastern U.S. Restoration from degraded open-water conditions to back-barrier salt marsh habitats involved re-building dunes, closing breaches, and restoring tidal channels throughout the marsh. The restored hydrological and salinity regimes are supporting the natural recolonization of salt marsh grasses and provide flooding protection to the neighboring communities. During the past three summers, close to 100 piping plover chicks have fledged their nests on the restored barrier beach. Over \$40 million was invested in the project, and the coastal program and research reserve continue to provide water quality, water level, salinity transects, sediment flux, and flow data used for adaptive management of the restoration effort. The tidal marsh and barrier beach restoration project at Prime Hook National Wildlife Refuge was the recipient of a 2019 Climate Adaptation Leadership Award for Natural Resources presented by the Association of Fish and Wildlife Agencies.

The coastal program also supported a second large-scale restoration project along the Delaware Bay in Mispillion Harbor, a primary area for horseshoe crab spawning. In the late 1990s and early 2000s, the coastal program supported research to better understand migratory shorebird and horseshoe crab spawning interdependency and the loss of spawning habitat. The coastal program funded a study for proper design of the jetties and the surrounding shoreline to preserve the rapidly eroding habitat. The area was significantly impacted by both Hurricane Irene in 2011 and Superstorm Sandy in 2012. A restoration project that capitalized on the monitoring data and previous planning was completed in 2018. The project included expanding an existing beach and planting dune grass in an area that hosts the largest concentration of horseshoe crab eggs and spawning anywhere in the Delaware Bay.

The coastal program developed a GIS model to conduct a suitability analysis of lands in Delaware that may have the potential for future marsh migration (<https://bit.ly/3bGne7C>). The analysis looked at 2-foot, 4-foot, and 7-foot sea level rise scenarios and considered soil type, slope, land use, land cover, and distance to current tidal wetlands to determine suitability. The results of the 4-foot sea level rise migration model indicate that 26,391 acres are highly suitable for migration, a majority of which are on privately owned, unprotected lands (60 percent). More than 43 percent of the highly suitable areas are currently non-tidal wetlands, and almost 34 percent are currently agricultural lands. This information was shared with state land managers, and the Delaware Open Space Program is using the maps to identify parcels and

prioritizing acquisition of lands that allow for future marsh migration. Partners are also exploring use of the GIS model to identify areas of future saltwater intrusion, which is an area of major concern for farmers who rely on groundwater to irrigate their crops.

### ***Identification of Tidal Wetlands***

In Delaware, state wetland managers regulate tidal wetlands using a static wetland line developed from aerial photographs taken in the 1980s and adopted by the state legislature in 1988. Delaware has a sea level rise of 3.2mm per year. The coastal program worked with the Division of Water's Wetlands and Subaqueous Lands Section to undertake a research project with two main objectives: (1) to compare the current 1988 static regulatory tidal wetland line to wetland delineations established by applying three different wetland delineation methods and (2) to compare the differences between two individual team interpretations of the methodologies used. The researchers found that the most cost-effective approach is to perform desktop delineations using the most current aerial photography and randomly verifying those delineations by ground-truthing areas with experienced wetland professionals and wetland experts familiar with the area. The study also identified areas where desktop delineations were potentially problematic, such as areas with freshwater inputs, regions with a gradual slope, and areas with difficult or complex vegetative indicators. Those areas were targeted for validation using both desktop and field-based delineations. Although the state has decided not to move forward with an update of the tidal wetland line, this research provides a science-based framework and methodology to update the tidal wetland line in response to future changes in sea level.

### ***Marine Debris and Contamination***

The coastal program has been a leader in supporting marine debris research to better understand the magnitude and scale of marine debris issues in Delaware Bay and tributaries feeding into the Bay. This research is focused on identifying the scope of the problem, researching opportunities, and developing partnerships to mitigate those problems.

Microplastics are an emerging issue of concern as they can be ingested by marine organisms and transported up the food web. For example, there is a concern that microplastics may impact blue crab larvae; blue crab is an economically important fishery in the Bay. With little known about the extent of microplastics in Delaware's coastal waters, the coastal program developed a methodology and sampling plan to determine the extent of microplastics in surface waters, sand, and sediments. The coastal program also completed the first beach sand microplastic analysis in Delaware that detected microplastics, the majority of which were microbeads. Collaboratively, the reserve led a companion surface water effort, which detected the presence of microplastics in the surface water of the St. Jones River. The coastal program is continuing its work through new research and the establishment of new partnerships, including with the University of Delaware, U.S. Environmental Protection Agency, Delaware River Basin Commission, Chesapeake Research Consortium, U.S. Geological Survey, and National Park Service. The coastal program is coordinating partner efforts to help prioritize monitoring and

cleanup efforts and to continue to identify new hotspots and landscape point and nonpoint sources of microplastics entering the Bay.

The coastal program has also worked to address mega-debris. For example, after Superstorm Sandy, NOAA acquired aerial photography to help understand the impacts of the storm. The coastal program used this information to conduct a desktop-based GIS analysis to identify the type and location of mega-debris items along the coast. The coastal program then coordinated with the appropriate department programs, such as the Division of Watershed Stewardship's Derelict Vessel Removal Program, to provide critical information to support removal of the 127 mega-debris items identified, where removal was deemed to be feasible.

The coastal program partnered with the University of Delaware and Sea Grant to conduct a pilot study to determine how many derelict crab pots there were in Delaware Bay. Derelict crab pots can adversely impact economically important blue crab populations. Working with Sea Grant and commercial fishing partners, the coastal program tested different sonar technologies and grappling hooks to identify, locate, map, and remove derelict crab pots. Mapping results from this pilot study revealed that there is a higher concentration of derelict crab pots in Delaware Bay than found in previous studies in New Jersey and in Chesapeake Bay. Researchers also found that Delaware Bay's strong currents make retrieval efforts challenging. Project partners are looking to expand the study into inland bays and are considering more efficient methods to locate and remove derelict crab pots from Delaware Bay.

The coastal program, in coordination with the Watershed Approach to Toxics Assessment and Restoration project team, conducted sediment toxicity tests within the St. Jones River to understand the impact of the Dover Gas Light Company superfund site on downstream properties, including the St. Jones Reserve and other Delaware Fish and Wildlife properties. The results are being used to establish baseline data sets and to understand the current levels of sediment toxicity. This work will also assess how sediment toxicity may change if any restoration activities occur in the future. The coastal program plans to establish five sampling sites in the Jones River and sample those sites every five years to monitor any future changes in sediment toxicity.

### ***Delaware Ocean and Bay Planner***

The coastal program successfully competed for a 2012-2014 NOAA Coastal Management Fellow, who developed the Delaware Ocean and Bay Planner (<https://maps.dnrec.delaware.gov/oceanplanning/>), an interactive mapping portal to guide economic development in the marine environment through streamlined decision-making. Resource and use data were collected from a wide range of resource agencies and stakeholder groups and integrated into a comprehensive database. The tool enables project planners and permittees to quickly visualize the potential conflicts between proposed uses and assess potential relationships between those uses. Since completion in 2015, the planning tool has been applied to many planning efforts to guide proposed development activities and uses of the marine environment. It has proven to be an effective way to coordinate planning activities and communicate the potential impacts of those activities on the marine environment. The tool

has been used by many to improve planning efforts, including reducing negative impacts to sensitive benthic regions on the outer continental shelf.

### ***Findings for Science to Management***

**Accomplishment:** The Delaware Coastal Management Program, in close partnership with the Delaware National Estuarine Research Reserve, is a leader in identifying emerging issues and developing innovative ways to connect partners, researchers, and stakeholders to support applied research that results in science-based management solutions.

### **Recommendation:**

The NOAA Office for Coastal Management encourages the Delaware Coastal Management Program to continue to support applied science to identify innovative solutions to emerging issues and guide development of new and revised regulations, including using research results to guide development of regulations that include sea level rise considerations.

## **Coastal Resilience**

### ***Overview***

Delaware is the lowest-lying state in the nation with one of the highest rates of sea level rise. The state has 57 municipalities, only five of which have more than 10,000 residents. Most communities have minimal local planning capacity, so they rely heavily on the state for support and technical assistance. The coastal program was commended by the stakeholders for its leadership in state efforts to address climate impacts, its success in convening stakeholders to move policy and planning forward, and forward-thinking tool development and capacity building. As one person described it, it has been the “epicenter of coastal resilience initiatives” for the state.

Delaware has 381 miles of coastline, and coastal tourism is a major contributor to the state’s economy. The state faces significant development pressure in areas that are susceptible to extreme weather and extra-tropical storm events, which coupled with rising sea levels are putting an increasing number of people at risk. The coastal program’s leadership in conducting a sea level rise vulnerability assessment in 2009 was critical to opening a broader dialogue in the state about sea level rise, and the coastal program has continued to lead in bringing together partners and stakeholders to assess and plan, build capacity, and implement resilience initiatives.

In November 2010, the department convened a newly established Sea Level Rise Advisory Committee, composed of members from a wide variety of stakeholder groups, including state agencies, local governments, and citizen, business, and environmental organizations. Coastal program staff members led and supported the committee over its three-year lifespan. The coastal program led the development of tools, documents, and maps to support this effort. For example, the coastal program’s senior scientist led the technical committee in the development of sea level rise planning scenarios that provided a framework for all the committee’s work.

From the scenarios, GIS maps were developed to show inundation areas statewide, which supported vulnerability assessments conducted on the state’s natural resources, infrastructure, business, and economy. In 2013, the committee completed its work, providing the secretary with a report, *Preparing for Tomorrow’s High Tide: Recommendations for Adapting to Sea Level Rise in Delaware* (2013), which includes 55 recommendations to improve the state’s capacity to adapt to sea level rise. As of December 2018, 25 recommendations had been completed, and 13 were in progress. Coastal program staff members successfully facilitated the advisory committee through the resolution of controversial issues, including ideas to change taxing structures, require disclosure of sea level rise information on real estate transactions, and incorporate sea level rise into regulations for industrial development along the coast. A workshop held in March 2014 brought together experts to develop specific implementation actions. The outcomes of the workshop were published in the report, *Preparing for Tomorrow’s High Tide: Sea Level Rise Workshop Proceedings and Interim Implementation Plan* (2014).

The advisory committee’s work laid the groundwork for a new executive order. In September 2013, the governor passed Executive Order 41, “Preparing Delaware for Emerging Climate Impacts and Seizing Economic Opportunities from Reducing Emissions.” The executive order established the Governor’s Committee on Climate and Resiliency to oversee development of a statewide mitigation plan and an implementation plan to improve the state’s preparedness and resilience to climate impacts and required state agencies to include sea level rise considerations in the design of state projects and long-range plans.

The coastal program met and exceeded its two 2012-2017 evaluation metric targets related to coastal resilience. The coastal program, with assistance from the reserve’s coastal training program, held 74 coastal hazard-related education and training events, more than doubling its target of 30. The coastal program also supported 26 recommendations for adapting to sea level rise through technical assistance, financial assistance, or both, again more than doubling its target of 10. The coastal program’s leadership and financial and technical assistance is improving the public health and safety and building the state’s coastal resilience. Going forward, the office recommends that the coastal program regularly update the three climate change planning scenarios used by the state based on the most recent science and continue to develop shovel-ready projects that, when funding becomes available, are ready to be implemented.

### ***Resilient and Sustainable Communities League***

The coastal program created and is providing coordination support for the Resilient and Sustainable Communities League, a collaborative network made up of 18 state agencies, nongovernmental organizations, and universities working to promote resilience and grow the capacity of communities by providing actionable information. The league helps state agencies maximize resources and share and build expertise in the state. State partners noted the value the group had brought in helping the state maximize resources and share and build expertise. The league holds regular “coffee hours” that provide information, training, and connections, and in 2017 held its first annual summit, bringing together resilience practitioners, elected officials, government agencies, and community members to discuss and learn about resilience

and sustainable communities. The Resilient and Sustainable Communities League serves as a bridge between state and local government. Members have worked together to help local governments address climate impacts through a variety of projects and initiatives. The evaluation team heard from both state and local stakeholders about the importance of the league and the coastal program's ability to provide facilitation, coordination, and technical assistance.

There are opportunities for the coastal program to invest in additional staff members to strengthen the Resilient and Sustainable Communities League and continue to build broader long-term cross-agency support, including financial support, for the league. Local communities are increasingly interested in adaptation and building resilience. The coastal program should also consider how it could expand staff support or other ways to increase the capacity for engaging and supporting Delaware's coastal communities. The coastal program could also consider opportunities to capitalize on its expertise in coastal policies and convening capabilities to offer assistance to state partners in revising the policies, rules, and regulations, particularly the Beach Preservation Act and Wetlands Act to incorporate sea level rise and other coastal hazards.

### ***Tools***

The coastal program has developed or funded development of several tools to help emergency managers, communities, and citizens understand the impacts of sea level rise and become more aware and prepared for coastal storms.

- The coastal program led the update of sea level rise scenarios for Delaware in 2017 as required by Executive Order 41. The coastal program partnered with the Federal Emergency Management Agency to develop A Delaware Floodrisk Adaptation Map which incorporates a 3.3-foot sea level rise scenario onto existing Federal Emergency Management Agency flood maps and developed a user guide. The map was created for use by state agencies for planning purposes. The Delaware Department of Transportation used the map as part of a risk assessment that found sea level rise to be the highest risk faced by the state's road system.
- The coastal program along with Kent County and the Delaware Emergency Management Agency provided funding to the University of Delaware which, in coordination with the Delaware Geological Survey, developed the Coastal Flood Monitoring System (<http://coastal-flood.udel.edu/>). The system uses NOAA predictive surge levels for Delaware Bay coupled with digital elevation models for each watershed to show the extent of predicted flooding, including the road elevations of evacuation routes and depths of water on these roads. The system addresses a need that was made apparent in 2009 when a storm in the Mid-Atlantic that had little predicted impact caused severe flooding in central Delaware Bay without warning.
- The coastal program also supported the development of the Delaware Weather Hazard Index ([http://test.deos.udel.edu/data\\_new/dwhi.php](http://test.deos.udel.edu/data_new/dwhi.php)), which is in beta form. The index allows users to select their location and to see what the predicted values are for each

separate weather hazard component based on NOAA predicted values up to 48 hours in advance. The tool allows users to see what aspect of a storm will most impact them. For example, the surge from a nor'easter would have the greatest impact along the coast, but inland, a great threat might be posed by rain-induced flooding or wind gusts.

- The coastal program provided financial and technical assistance to the University of Delaware to develop a user-friendly web tool, Delaware Database for Funding Resilient Communities ([www.bidenschool.udel.edu/research-public-service/ddfrc](http://www.bidenschool.udel.edu/research-public-service/ddfrc)) that helps link communities with financial assistance to conduct resilience projects. The tool was developed as a resource for local governments that were finding it difficult to research and find available funding to implement resilience projects. The Federal Emergency Management Agency has highlighted the website and stated, “states throughout Region III should view this effort in Delaware as a best practice and look for opportunities to form partnerships and compile resources for resiliency projects that are specific for their states.”

The coastal program has been very successful in providing seed funding and technical assistance to jump-start the development of tools that are supporting state and local government efforts to build resilience. The office encourages the coastal program to continue to identify information gaps and work with partners to fill those gaps. One challenge with tool development is the ongoing need for funding to support maintenance and improvements. Although in some cases, the coastal program and project partners have identified longer-term support for a tool, for others it remains a challenge. The office encourages the coastal program to work with partners to develop long-term plans that identify resources to keep key resilience tools maintained and updated. The Resilient and Sustainable Communities League may be a good resource for this effort.

### ***Community Grant Program***

The coastal program provides grants to local municipalities to deal with coastal hazards and sea level rise. Before 2016, the coastal program awarded community grants in the range of \$5,000 to \$25,000 for small projects or to assist in comprehensive plan development. Many of these projects, while worthwhile, may not have addressed the most important issues that the community faced or took a piecemeal approach to planning and implementation. To maximize resources, the coastal program initiated the Resilient Community Partnership; this program selects a single municipality or group of municipalities to work on a major issue as it relates to resilience.

### ***Town of Slaughter Beach***

The first Resilient Community Partnership project was with the Town of Slaughter Beach, bounded on the south by the Prime Hook National Wildlife Refuge, the west by Slaughter Creek, the north by Cedar Creek, and the east by the Delaware Bay. The town routinely experiences flooding from storms and extreme tides. The town’s only two access roads often flood for up to three days at a time, posing risks for evacuation. The town had limited capacity to address this issue on its own. The coastal program worked with the town to conduct a



comprehensive vulnerability assessment of risks from coastal storms, sea level rise, extreme tide and other potential risks, including wildfires and temperature changes due to climate change. This assessment produced data and visualization tools that characterized the town's risk. This information was used to develop a list of adaptation and mitigation actions to assist in the town's efforts to increase coastal resilience. The town, in partnership with Delaware Natural Resources and Environmental Control and Delaware Department of Transportation, is already implementing four recommendations, including installation of a real-time flood warning system for its two evacuation routes, which was completed in September 2018.

### *City of New Castle*

The City of New Castle is a National Landmark Historic Area with the nation's oldest levees shielding it from the Delaware River. In prior years, the coastal program worked with the city to assess the city's vulnerabilities to coastal hazards and to inspect four dikes in town, which were found to be in "unacceptable condition." The coastal program organized an advisory committee of city, county, and state officials to prioritize restoration needs and actions and identify funding sources. A fifth levee protecting an Environmental Protection Agency superfund site was also found to be on the verge of failure. A multi-year, multi-million dollar coordinated effort to restore the flood control structures was undertaken, but in 2012, with engineering and design underway, two large coastal storms, Superstorm Sandy and a December nor'easter, severely impacted the already weakened structures to the point of potential failure. Just before Superstorm Sandy, the city worked closely with the coastal program to obtain permits and do an emergency shoring up of the levee. With the information compiled by the coastal program, the department was able to work with the state legislature, which appropriated more than \$7.5 million to conduct the necessary reconstruction of the levees to protect this vulnerable region.

Led by the coastal program, with the New Castle County Conservation District as construction manager, the state and federal agency partners conducted historical surveys, secured necessary permits and contractors for construction, and planned a large-scale wetland enhancement project to voluntarily mitigate the impacts of these activities. Trails on the levees provide economic benefits to the local economy, and community members enjoy the recreational opportunities. In 2015, the department and conservation district received the Water Resources Association of the Delaware River Basin's Government Award for leading the effort to reconstruct the historic levee system that protects the City of New Castle from flooding and the release of contaminants.

The second Resilient Community Partnership project built on these prior efforts. The coastal program worked with elected officials and city staff members to conduct a comprehensive vulnerability assessment of risks from coastal storms, sea level rise, and extreme tides, and then developed an adaptation plan with 31 recommendations. The Resilient and Sustainable Communities League was a strong supporter of the project, and other state agencies were able to provide technical assistance as well. A city council member stated that resilience topics come up at every council meeting, and the city is attempting to "knock off action items in the plan." With this plan in place, the city has been able to successfully compete for funding to initiate some of the identified measures. The project stakeholders noted the value of the long-term

partnerships and that all parties at the table were expected to work together. Going forward, the city will continue to rely on these partnerships as it moves forward with various work, including educating the community, retrofitting, developing emergency operations plans for the dikes, and increasing participation in the National Flood Insurance Program.

The third and current Resilient Community Partnership involves eight coastal communities along the Atlantic Coast, from Lewes to Fenwick Island, who are seeking to examine the increasing rate of impervious surface and its influence on flooding. This partnership is unique because it is the first time that all the beach communities have gotten together to address a common problem. The coastal program, with help from two contractors, will develop a guidebook of methods to increase stormwater infiltration tailored to each community. Concurrently, the coastal program and contractor will examine the local ordinances and create a model ordinance, again tailored to each community, to limit the increase in impervious surface on building lots as small cottages are being replaced with mansions.

### ***Findings for Coastal Resilience***

**Accomplishment:** The Delaware Coastal Management Program has continued to build on the early groundwork laid to increase the state's coastal resilience. The coastal program

- brought together state agencies and other partners to collaborate through the Resilient and Sustainable Communities League;
- provided educational and outreach opportunities to build capacity throughout the state;
- supported research and the development of tools to inform decision-making; and
- provided technical and financial support to local communities to support efforts to build resilience.

**Recommendation:** The NOAA Office for Coastal Management encourages the Delaware Coastal Management Program to build on its success in increasing the state's coastal resilience by exploring opportunities and innovative means to increase staff capacity to provide technical assistance and support local governments and other stakeholder efforts.

## Evaluation Metrics

Beginning in 2012, state coastal management programs began tracking their success in addressing three evaluation metrics specific to their programs. The evaluation metrics include a five-year target and provide a quantitative reference for each program about how well it is meeting the goals and objectives it has identified as important to the program. In 2018, coastal programs began a new five-year period and set targets specific to their programs for two performance measures from the existing Coastal Zone Management Performance Measurement System and the coastal hazards performance measure.

### *Evaluation Metrics 2012-2017*

#### **Metric 1: Coastal Hazards**

**Goal:** To increase the information available to the general public and local, county, and state officials in Delaware regarding sea level rise and its impacts.

**Objective:** By 2017, the Delaware Coastal Management Program will provide technical, financial assistance, or both for 30 coastal hazard education and training events for the general public and local, county, and state officials.

**Strategy:** The state currently faces impacts from climate change though increased sea level rise, increased coastal erosion, and other impacts. The state is developing a “Sea Level Rise Adaptation Strategy” focusing on implementation actions important for state agencies’ missions. The Sea Level Rise Advisory Committee education and outreach workgroup developed the Sea Level Rise Outreach Strategy (submitted to NOAA as part of the Oct 1, 2010 – March 31, 2011 progress report for grant NA10NOS4190202) to communicate with and engage stakeholders in Delaware. The approach for meeting this goal is outlined in that plan. For consistency in data collection and reporting, the definitions for education and training events will be the same as those set forth by the Coastal Zone Management Performance Measurement System.

**Performance Measure:** Number of coastal hazard related education and training events for which the Delaware Coastal Management Program provides technical assistance, financial assistance, or both.

**Target:** By 2017, 30 coastal hazard related education and training events for which the Delaware Coastal Management Program provides technical assistance, financial assistance, or both.

#### **Results:**

Year 1:	37 coastal hazard related education and training events
Year 2:	20 coastal hazard related education and training events

Year 3: 7 coastal hazard related education and training events  
Year 4: 4 coastal hazard related education and training events  
Year 5: 6 coastal hazard related education and training events

**Total: 74 coastal hazard related education and training events**

**Discussion:** The coastal program achieved 247 percent of its target for coastal hazards education and training events. Building state and local capacity to address coastal hazards has been a focus of the coastal program during the evaluation period as discussed in the findings. The coastal program created the Resilient and Sustainable Communities League, which regularly provides training through “coffee hours” and an annual summit.

## **Metric 2: Coastal Hazards**

**Goal:** Integrate sea level rise adaptation recommendations into hazard mitigation planning in Delaware.

**Objective 1:** Ensure early implementation of Delaware’s Sea Level Rise Adaptation Plan recommendations.

**Strategy:** The state currently faces impacts from climate change though increased sea level rise, increased coastal erosion, and other impacts. The state is developing a “Sea Level Rise Adaptation Strategy” focusing on implementation actions important for state agencies’ missions. The approach for meeting this goal is in Delaware Coastal Management Program’s 2011-2016 309 Strategy: Delaware Sea Level Rise Adaptation Plan Refinement and Early Implementation. The sea level rise adaptation recommendations will drafted by the fall of 2012. Implementation will begin before finalizing the document.

**Performance Measure:** Number of adaptation plan recommendations supported by the Delaware Coastal Management Program through technical assistance, financial assistance, or both.

**Target:** By 2017, 10 adaptation plan recommendations supported by the Delaware Coastal Management Program though technical assistance, financial assistance, or both.

### **Results:**

Year 1: 2 adaptation plan recommendations supported by the coastal program  
Year 2: 3 adaptation plan recommendations supported by the coastal program  
Year 3: 16 adaptation plan recommendations supported by the coastal program  
Year 4: 4 adaptation plan recommendations supported by the coastal program  
Year 5: 1 adaptation plan recommendations supported by the coastal program

**Total: 26 adaptation plan recommendations supported by the coastal program**

**Discussion:** The coastal program achieved 260 percent of its target with 26 adaptation plan recommendations supported by the coastal program. The coastal program invested significant resources in coastal resilience during this period, including creating the Resilient and Sustainable Communities League, a group to help coordinate state efforts and extensive financial and technical support for local communities.

### **Metric 3: Government Coordination**

**Goal:** Support an informed network of local, state, and federal government offices willing to coordinate actions to achieve local and regional results.

**Objective:** By 2017, the Delaware Coastal Management Program will provide technical assistance, financial assistance, or both for 30 government coordination events related to marine management and planning for local, state, and federal government offices.

**Strategy:** With increasing demands for ocean resources, the state relies heavily on both intrastate and interstate governmental coordination to manage local and regional impacts on its coastal resources. The state is participating in the Mid-Atlantic Regional Council on the Ocean to address the increasing human influences affecting the responsible and sustainable management ocean waters of the Mid-Atlantic. The approach for meeting this goal is in the Delaware Coastal Management Program's 2011-2016 309 Strategy: Management Plan for Delaware's Atlantic Coast Marine Area. For consistency in data collection and reporting, the definition for government coordination events will be the same as that set forth by the Coastal Zone Management Performance Measurement System.

**Performance Measure:** Number of marine management related government coordination events for which the Delaware Coastal Management Program provides technical assistance, financial assistance, or both.

**Target:** By 2017, 30 marine management related government coordination events for which the Delaware Coastal Management Program provides technical assistance, financial assistance, or both.

#### **Results:**

Year 1: 13 marine management related government coordination events  
Year 2: 13 marine management related government coordination events  
Year 3: 8 marine management related government coordination events  
Year 4: 3 marine management related government coordination events  
Year 5: 10 marine management related government coordination events

**Total: 47 marine management related government coordination events**

**Discussion:** The coastal program achieved 156 percent of its target for marine management related training events over the five-year period. This measure helps document the coastal

program's extensive support for regional ocean management over the time period as discussed in the findings.

### ***Evaluation Metrics 2018-2023***

#### **Metric 1: Coastal Hazards**

**Goal:** The state and its coastal communities effectively plan and prepare for change.

**Objective:** By 2023, assist the local, county, and state decision-makers and coastal communities to prepare for and minimize the risks from coastal hazards and changing conditions through the planning.

**Strategy:** The state currently faces increasing impacts from coastal hazards and changing conditions. In its almost decade-long effort to prepare for these impacts, the Delaware Coastal Management Program has worked to establish partnerships with networked agencies and universities and built a reputation for assisting coastal communities. It will continue to utilize these connections, its position as a steering committee member on the interagency Resilient and Sustainable Communities League, and its own Resilient Community Partnership to identify projects and planning needs at the state and local levels for support. The coastal program anticipates the completion of a) one state-level policy or plan, b) three local-level policies or plans, c) three state-level projects and d) three local-level projects to reduce future damage from coastal hazards with assistance from coastal program funding or staff. It should be noted that previous years' efforts have resulted in a higher number of projects completed. This was a period when communities were seeking small grants and addressing issue at the local level in a piecemeal manner. With the development of the Resilient Community Partnership, the coastal program began investing staff and resources in larger projects, by either working with one community to complete a holistic vulnerability assessment with strategy implementation or by working with multiple communities to address a regional issue. While this has resulted in fewer projects being completed, the new comprehensive approach is more sustainable than the previous piecemeal ventures.

**Performance Measure:** Number of a) state-level policies and plans; b) local-level policies and plans; c) projects completed at the state level; and d) projects completed at the local level to reduce future damage from coastal hazards with assistance from Delaware Coastal Management Program funding or staff.

**Target:** Between 2018 and 2023, complete a total of 10 a) state-level policy or plans, b) local-level policies or plans, c) state-level projects, and d) local-level projects to reduce future damage from coastal hazards with assistance from Delaware Coastal Management Program funding or staff.

#### **Results:**

Year 1: 3 state or local-level policies or plans or state or local projects

**Discussion:** The coastal program is 30 percent of the way toward its target and is making good progress. Coastal hazards and climate resilience has and continues to be a priority of the coastal program for over a decade as discussed in the findings.

### **Metric 2: Coastal Hazards**

**Goal:** The state and its coastal communities effectively plan and prepare for change.

**Objective:** By 2023, increase the information available to local, county, and state decision-makers and coastal communities in Delaware to prepare for and minimize the risks from coastal hazards through training.

**Strategy:** The state currently faces increasing impacts from coastal hazards and changing conditions. To prepare for and mitigate these impacts, the Delaware Coastal Management Program has used its resources and technical expertise to assist resource managers and coastal decision-makers to identify and fill data gaps, develop tools to centralize information and alert locals to impending hazards, and work with federal partners to build skills necessary to prioritize options to effectively use limited resources. The coastal program aims to transfer acquired knowledge to local, county, and municipal decision-makers, as well as research and academic partners, in an effort to further expand its application throughout the Delaware.

**Performance Measure:** Number of coastal hazards training events supported by the Delaware Coastal Management Program through technical assistance, financial assistance, or both.

**Target:** By 2023, 25 coastal hazards training events for which the Delaware Coastal Management Program provides technical assistance, financial assistance, or both.

#### **Results:**

Year 1: 7 coastal hazards training events.

**Discussion:** The coastal program is making good progress toward its target for coastal hazards training events and is at 28 percent of its target in the first year. Coastal hazards continues to be a focus of interest for the coastal program.

### **Metric 3: Government Coordination**

**Goal:** Strengthen the Delaware Coastal Management Program's ability to advance coastal management.

**Objective:** By 2023, increase state coastal zone management implementation capacity.

**Strategy:** Recent staff turnovers within the Delaware Coastal Management Program, networked agency offices, and regional and federal agencies have resulted in a weakened communication

network and an insufficient understanding of the need for and proper administration of federal consistency. The Delaware Coastal Management Program has developed a multi-prong plan in an effort to reestablish a well-coordinated network of partners and foster a greater understanding of the importance of federal consistency as it continues to review current and emerging activities that affect the state's coastal resources and uses. This approach consists of focused training sessions with local governments, applicant agencies, and networked partners.

**Performance Measure:** Number of federal consistency-related government coordination training events for which the Delaware Coastal Management Program provides technical assistance, financial assistance, or both.

**Target:** Between 2018 and 2023, 10 federal consistency related government coordination training events for which the Delaware Coastal Management Program provides technical assistance, financial assistance, or both.

**Results:**

Year 1: 4 federal consistency related government coordination training events.

**Discussion:** The coastal program is already 40 percent of the way toward meeting its target. As discussed in the findings, the coastal program has recently reinvigorated its federal consistency program and is in the process of hosting trainings with its partners to increase understanding and improve the federal consistency process.



## Conclusion

For the reasons stated herein, I find that the State of Delaware is adhering to the programmatic requirements of the Coastal Zone Management Act and its implementing regulations in the operation of its approved Delaware Coastal Management Program.

These evaluation findings contain three recommendations that must be considered before the next regularly scheduled program evaluation but which are not mandatory at this time. Recommendations that must be repeated in subsequent evaluations may be elevated to necessary actions.

This is a programmatic evaluation of the Delaware Coastal Management Program that may have implications regarding the state's financial assistance awards. However, it does not make any judgment about or replace any financial audits.

signed by Jeffrey L. Payne  
Jeffrey L. Payne, Ph.D.  
Director, NOAA Office for Coastal Management

dated May 27, 2020  
Date

## **Appendix A: Response to Written Comments**

No comments received.